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*Abstract*

National accounts generate a variety of indicators used in economics for determining the value of goods and services. This chapter highlights two problems in the measurement of such indicators, namely the construction of the data at the macro level using individual observations from different sources, and the interpretation of the data when economic relationship are empirically investigated using these data at the macro level. The chapter pays ample attention to the institutional set-up of national accounting, and to the use of indicators derived from the national accounts in policy analysis in various industrialised countries. Major difficulties in interpretation arise when the indicators are used in the assessment of (social) welfare and in separating developments in prices and volumes.

*Keywords*: National accounts, economic indicators, policy analysis, political economy, policy preparation

*JEL-codes*: D60, E30, H11, C00

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# National accounts and indicators

Frank A.G. den Butter[1]

## 1. Introduction

National accounts provide a quantitative description of the state of the economy at the macro level. Indicators derived from national accounts are widely used in economic policy analysis. Examples are national income, price and wage deflators as measures of inflation, purchasing power, total employment, imports, exports, current account of the balance of payments, government receipts and expenditure, government deficit, total consumption, investments, stock building, etc.. In almost all countries data of the national accounts are compiled by the National Statistical Offices (NSOs) following uniform international guidelines.

National accounts' data are based on individual observations of persons, households, firms and government bodies. Most of these observations stem from administrative records and are supplemented by evidence from surveys and field observations. The major conceptual problem of the construction and use of these data is that observations at the micro level are to be combined and aggregated to the macro level in order to comply with concepts from economic theory used in policy analysis. It implies that there will always be a discrepancy between interpretations and semantics of concepts at the macro level, and the way they are given empirical content by the statistics from the national accounts. National income may have different meanings and connotations in various macro economic analyses. However, when national accounts' data are used in these analyses to represent the concept of national income empirically, it is the definition of national income according to the rules of national accounting which determines how this concept is made operational. To give another example: many inhabitants of the European Union had the impression that after the introduction of the Euro life had become much more expensive. Yet, according to the price deflators computed by the NSOs, following the standard aggregation methods, "in reality" only a slight increase of inflation could be observed. Obviously there was a discrepancy between the men and women in the streets' view on inflation, and the way this concept is made operational in statistical accounting.

This chapter focuses on the conceptual problem of the construction and use of indicators from the national accounts in policy analysis. As the author is especially familiar with the situation in the Netherlands, most examples and historical anecdotes stem from that country. The contents of the article is as follows. The next section describes the characteristics and methodology of the national accounts. Section 3 surveys the history of national accounting and section 4 discusses the interaction between the collection and use of data at the macro level in the last two centuries in the Netherlands. Section 5 considers

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the role of statistics and economic policy analysis in the institutional set-up of the polder model in the Netherlands. Section 6 discusses the history of national accounting and the institutional set-up of policy preparation in some other industrialised countries. Sections 3-6 provide insight into the confrontation between scientific knowledge and practical policy needs, which has been crucial in the development of the national accounts. Section 7 examines the present situation, issues for discussion and prospects for national accounting. The relationship between construction and use of various main economic indicators from the national accounts is discussed in section 8. This section also gives examples where the conceptual problem of measurement and use has been subject of fierce debate, such as the use of NA statistics as welfare indicators and the correction of national income for environmental degradation. Finally section 9 concludes.

## 2. National accounts as indicators of the state of the economy

The national accounts (NA) or the national bookkeeping of an economy provide a quantitative description of the economic process at the level of the state during a certain period. Particularly those aspects of the economic activities are described which are directly or indirectly related to the formation, distribution, spending and financing of the domestic product or national income. Moreover the national accounts provide insight in the economic relations with foreign countries.

More specifically three different approaches are used in national accounting in order to describe economic developments at the level of the state. The first one is the *expenditure approach,* which determines aggregate demand, or gross national expenditure, by summing consumption, investments, government expenditure and net exports. The second way of measurement is the *output (or production) approach.* Here total production of a nation is calculated by summing added value in production in all sectors of the economy and net income from abroad. The third method of measurement is the *income (distribution) approach.* This method illustrates how national income has been earned and has been distributed amongst the income factors (wages, rents, profits). All three methods use different sources for the compilation of data, but, in the end, must yield the same outcomes for national income and expenditure data. Total expenditures on goods and services must by definition be equal to the value of goods and services produced, which must be equal to the total income paid to the factors that produce these goods and services. In fact there will be minor differences in the results obtained from the three different methods. A source of these differences are inventories that have been produced but not sold. But also the use of various sources for compilation of the data may be a reason that the definition equations, which are balancing identities in the double (or even triple) bookkeeping of the national accounts, do not hold. A solution is to have one of the items as the residual item to be determined by the definition equation (e.g. stock building in the production approach, and profits in the income approach). However, most NSOs use much more sophisticated methods to distribute discrepancies between the various approaches so that the balancing definitions hold and the system is made consistent.

In this confrontation of income and expenditures, national accounts' data generate a number of important economic indicators, such as the domestic product and national income. The domestic product is the sum of all goods and services produced in the country. More specifically it is the difference between the output value of the production and the input value of goods and services used in production. This is the added value of production in the country. National income, in its turn, indicates how much all residents of a country earned in a specific period. These loose definitions of both indicators only give a first impression of the core indicators from the system of national accounts. For more formal definitions of the various ways income and production are measured at the macro level we refer to the official guidelines for the construction of the national accounts, and to the publications of the various NSOs which specify how these guidelines are implemented in the specific case of the country concerned

National accounting does not aim at explaining the past, nor at forecasting future developments. It is solely directed at the *recording of the economic activity in the past*. This knowledge of the macroeconomic data from the past is indispensable for the construction and testing of economic theories, and for the building of empirical models, such as the macroeconomic models, which are nowadays used all over the world in order to examine economic developments and to calculate effects of measures of economic policy. This knowledge is also essential for formulating concrete policy goals, for example with respect to the development of the purchasing power or with respect to the extent that the collective sector makes use of national resources. National accounts data also give an answer to the question to what extent the policy goals have been realised. This illustration of the scope and use of the national accounts is indicative for what must be included in the description of the economic process. On the one hand the selection of data is motivated by the needs from economic theory, and on the other side by the demands from policy analysis. With respect to the latter, demands do not only stem from the government. Trade unions and employer associations base their policy likewise on data from the national accounts. An example is the development of prices and labour productivity, which play a major role in the wage negotiations.

The system of the national accounts can be characterised as a coherent and integrated data set at the macro level. The consistency of the data in the accounting scheme is guaranteed by using definition equations and identities, which relate the underlying observations from various statistical sources to each other. This quality of the system is crucial for its use in economic analysis and policy: its structure of interdependent definitions enables a uniform analysis and comparison of various economic phenomena. However, it also makes the system rather rigid. It is impossible to change individual concepts and/or definitions in the system. For instance, inclusion of a new component to domestic production is only possibly if at the same time the concepts of income, consumption, savings and investments are adapted.

The consistency of the system of national accounts is of great importance for the way the data are used in practice. A number of possibilities has already been mentioned. The domestic product and national income are frequently used as an overall indicator for the

functioning of the national economy. The success of the economic policy and the financial power of a nation are based on these indicators. In this line of reasoning the extent to which a country should provide development aid is expressed as a percentage of national income. National income is also the benchmark for payments of the various member states to the European Union. A higher national income means more payments. Therefore, it is extremely important that the calculation of national income is based as much as possible on objective criteria and is calculated according to international guidelines. It should not become subject of dispute between countries, and of political manipulation.

The same applies when the national income is taken as a basis for various economic indicators to guide and judge government policy. See for instance the debt and budget deficit of the government, which are, according to the Maastricht criteria and the limits set in the Stability and Growth Pact (SGP) of the EU, expressed as a percentage of national income. Moreover the relative importance of a specific economic sector, e.g. agriculture, industry or retail trade, can be illustrated by calculating its relative share in domestic production. However, the fact that national account data should be undisputed when used in policy practice, does not exclude that there can be much dispute between experts on proper definitions. By way of example Mellens (2006) discusses the various definitions of savings.

*Methodology*
National accounts are set-up for a number of possible uses. The consequence of such diversity is that the definition of the various concepts in the national accounts (e.g. of income) is not always completely in accordance with the intention and wishes of the users. An important choice in this respect is that between providing a description from the angle of the economic actors versus reproducing as correctly as possible economic processes. The first is called the *institutional approach* and the second the *functional approach*.

In the institutional approach the producers are the focus of the description of the production process. Their value added in production is classified on the basis of their main activities in sectors of the economy. Producers who perform mainly transport activities, therefore will be classified in the transport sector. This provides good information on total production value of producers in a specific branch of industry or services. However, it also implies that other activities of the producers in the transport sector, for instance some trading activities, are not counted as such in the national accounts. When the analysis focuses on the characteristics of the production activities themselves, such institutional approach is not very adequate and a functional approach is warranted.

The question of how to define a concept plays an important role in the national accounts and in the interpretation of the data from these accounts. Examples are construction and decorating activities of house owners and their families, and unpaid domestic work. Should these be included in the domestic product? One can think of pros and cons. The argument for inclusion is that they are productive services that would be included in the domestic product if they would be performed on payment by third parties. The counter argument is that inclusion would imply large changes in the domestic production, which would limit the use of this indicator in analysing the developments of the market economy. In fact, taxable

income is used here as criterion (see Bos, 2003, pp. 145-147). The problem of definition is, of course, very much connected to the desire for international comparability. An individual country or a statistical office does not decide about the definition of, for instance, income autonomously, but has to follow the definition laid down in the international directives. Of course there are always border cases and grey areas in these definitions. A typical example in the Netherlands is the (home) production from small rented gardens at distance from the homes (so called "volkstuintjes"). It is now included in the production statistics because the official directives suggest it should, but only after a foreign expert asked questions about the production of these gardens when he had seen them when travelling to the CBS (Netherlands Central Bureau of Statistics). However, most of such cases relate to small amounts which will not influence interpretation of the data.

*National accounts and the theory of measurement*

A major question of this chapter is how national accounts' data can be used in measurement of economic phenomena and relationships. From a theoretical perspective this question relates to the way the construction and compilation of data of the national accounts are related to the theory of measurement. According to Boumans (2007, this volume, p?) today's measurement theory is the Representational Theory of Measurement. It is described as taking "measurement as a process of assigning numbers to attributes of the empirical world in such a way that the relevant qualitative empirical relations among these attributes are reflected in the numbers themselves as well in important properties of the number system". Boumans distinguishes two different foundational approaches in economics in the theory of measurement: the axiomatic and the empirical approach.

When considering measurement and national accounts the empirical approach is most relevant. For the use of these data in policy analysis modelling economic relationships based on economic theory plays a major role. That is why this chapter ample attention to the interaction between the provision of data at the macro level, the empirical analysis of economic relationships using these data and the policy analysis based on these relationships, or "models" of the economy. Loosely spoken, measurement theory is, in this respect, concerned with determining the parameter values of these models using the data constructed by the methodology of the national accounts. Modern econometric methodology, time series analysis in particular, teaches us how to establish this empirical link between data and characteristics of the model (see e.g. Chao, this volume). However, a number of methodological issues remains unsolved which nowadays have considerably reduced the role of econometric methodology in macroeconomic model building (see e.g. Don and Verbruggen, 2006). Three issues can be mentioned. A first issue is that consistency of the models with theoretical requirements and with long run stylised facts is often at variance with parameter estimates which are a mere result of applying econometric methods to one specific data set. A second issue is that econometric methodology requires specific conditions of the specification of a model, e.g. linearity, which are too binding for a proper use of the model. Thirdly, the relationship between the theoretical concept warranted in the model may be much at variance with the practical construction method according to which the data in the empirical analysis are obtained. This latter issue is most relevant for this chapter.

## 3. History of National Accounts

Important historical events such as wars, economic crises and revolutions have always called the need for good quantitative data on the economy at the macro level, and have therefore contributed considerably to the development of national accounting. A look into the early history teaches us that a need for such data for policy analysis formed the reason for the first estimates of national income. They were made respectively by Sir William Petty and Gregory King in 1665 and 1696 for United Kingdom (see Kendrick, 1970; Bos, 1992, 2003). Petty tried to show that the state could raise a much larger amount of taxes to finance the war expenditure than it actually did, and that the way of collecting taxes could be much improved. Moreover, Petty wanted to show that the United Kingdom was not ruined by its revolutions and by the wars with the foreign enemies, and that it could compare itself with the Netherlands and France with respect to the amount of trade and military potential.

The estimates by King can be regarded as an improvement to those of Petty. In his calculation method, King used a broad concept of income and production, similar to what it is today according to the guidelines of the United Nations. Production comprises the added value of both the production of goods and of services. This concept is in strong contrast with that of the physiocrats, who reasoned that only agriculture produces value added and that all remaining production is ' sterile '. Yet already Adam Smith argued that not only agriculture but also occupations in the trade and the industry produce added value. However, according to Smith, services, both by the government and by private businesses, do not generate additional value. In that sense the income concept of King was even broader and more modern than that of Smith. Beside the use of a ‘modern’ concept of income, a second important characteristic of the estimates of King is that he calculated national income already in three different ways, as it is done today, namely from the perspective of (i) production, (ii) income distribution and (iii) expenditure. Moreover, the calculations by King showed remarkably much detail. He did not restrict himself to the outcomes for total annual national income and the total annual expenditure and savings, but made a split up of these data with respect to social groups, to the various professions, and to different income groups. He also made an estimate of the national wealth (gold, silver, jewels, houses, livestock, etc.). King compared national income and national wealth of United Kingdom with those of the Netherlands and France. It is interesting to note that this aspect of international comparability – an important aim of the international guidelines - already played a role in the first estimates of national income ever. King constructed time series for national income for the period 1688-1695.Using these time series he calculated income forecasts for the years 1696, 1697 and 1698.

At about the same time in France estimates of national income were made by Boisguillebert and Vauban. It is unclear to what extent these estimates were influenced by the way national income was originally calculated in United Kingdom. However, the estimates of the English national income by Petty and King can be regarded unique as far as the quality and the scope of these estimates were hardly matched in the following two centuries. After

the pioneering work of King the number of countries for which national bookkeeping's were established, gradually increased. Around 1900, estimates were available for eight countries: United Kingdom, France, the United States, Russia, Austria, Germany, Australia and Norway. Compiling national accounts was not yet always considered as a task for the government. In this respect Australia was an early bird: here the government already started in 1886.

*The Netherlands*

International historic reports do not include the Netherlands in the above list of eight countries. Nevertheless the first estimates of national income in the Netherlands were already made much earlier (see Den Bakker, 1993). In fact the history of the national bookkeeping in the Netherlands starts at the beginning of the 19th century, with the calculations of national income by Hora Siccama and Van Rees in 1798, by Keuchenius in 1803, and by Metelerkamp in 1804. And again war was the reason for making these calculations. The major goal of these calculations was that they enabled a comparison of the wealth in the Netherlands with that of the neighbouring countries from the economic and military perspective. The calculations by Hora Siccama and Van Rees were part of a plan at the request of the national assembly of the new Batavian republic for revision of the tax system. The reason was to see how taxes could be levied efficiently, in proportion to personal wealth (see Bos, 2006). Keuchenius, a member of the city council of Schiedam, constructed a hypothetical estimate of national income which was based on the situation as if war in Europe would have ended and peace would have been established. Keuchenius estimated national income of the Netherlands to be about 221 million guilders, it is 117 guilders per head of the population. The share of agriculture and fishery in this income amounted to 45%, whereas 27% was transfer income from abroad (think of the rich import from the colonies). Metelerkamp, who knew the work of Keuchenius, introduced some improvements, and arrived at an estimate of national income for the Netherlands in 1792 of 250 million guilders, that is 125 guilders per head of the population.

The first systematic estimates of national income in the Netherlands were made by Bonger. The first year for which data were calculated, was 1908. It was published in 1910. The first official calculations of national income by the Netherlands Central Bureau of Statistics (CBS) were published in 1933 and refer to the year 1929. Finally it was Van Cleeff who constructed a coherent system of national accounts for the Netherlands in a two article publication in the Dutch periodical ' De Economist ' in 1941. Subsequently, on 19 January 1943 a commission for national accounting was installed at CBS. Today the installation of this commission is considered the official beginning of the Netherlands' national accounting (see Bos, 2006, for an extensive review of the history of national accounting in the Netherlands).

*Modern systems of NA*

The 1930's and 1940's provided inspiration for the modern system of national accounts. Three aspects played an important role. In the first place the discussion on what concepts of income to use at the macro level revived. Secondly developments in economic theory underlined the importance of national accounting. Thirdly the first coherent and approved

systems of national accounts were developed. The two most important protagonists in the discussions on the problems of the definition of national income (what should, and should not be included in income data) in the inter-bellum were Clark and Kuznets. Clark argued that services from house ownership were to be included in income, but services of durable consumer goods were not to be included. Clark already suggested to subtract every verifiable exhaustion of natural resources from income. Moreover he considered problems of purchasing power and international and intertemporal comparability of the national income data. This discussion of comparability continues today and has, for instance, resulted in the large PENN World Table-project of data collection and construction, where national income data are made comparable by using a constructed international price. More specifically, for each country the costs of a differentiated basket of goods are calculated and the national income data are corrected by means of the observed cost differences (see Summers and Heston, 1991).

Much more than Clark, Kuznets was also a prominent theoretician. He published on the link between changes in national income and welfare, on the valuation of production by the government and on the difference between intermediate and final production. Moreover he contributed a number of technicalities in data processing (interpolation, extrapolation). In 1936, Leontief made a next major step in the statistical description of an economy by presenting input/output tables. Although the basic idea of the input/output table is already present in Quesnay's ' tableau économique ' and in the way Walras described the working of the economy, Leontief's main innovation was the formulation of the model that directly connects the outputs with the inputs in an operational manner. In this way it portrays the complete production structure of a country and it enables to calculate which changes in inputs are needed in order to bring about a warranted change of the outputs. It should be noticed that there does not need to exist a direct link between the input/output tables and the national accounts. As a matter of fact in a large number of countries input/output tables are calculated only on an incidental basis, and outside the framework of the annual calculation of the national accounts. The Netherlands is an exception. Already for a long time in this country input/output tables are published annually together with the tables of the national accounts. In this case the input/output tables do not only form a separate source of information, but are also exploited as the main statistical tool to calculate the data from the production accounts.

*Importance of macroeconomic model building*

In the 1930’s, the start of macro economic model building and the consequent development of new econometric techniques were important innovations that increased the need for statistical data collection at the macro level, and hence for national accounting. In 1936, Tinbergen constructed the first macro model for the Dutch economy. In order to make the model describe the actual working of the economy empirically, the behaviour parameters of the model were estimated using time series data on all endogenous and exogenous variables of the model. For that reason other and longer time series at the macro level were needed than originally available. Moreover, the quality of the existing data had to be improved. Although Tinbergen realised the need of a good and comprehensive system of national accounts, he himself has not been involved directly in the drawing up of such a social

accounting system. However, the CBS started already in 1937 at the request of Tinbergen a project that aimed at improved estimates of the national income. Its focus was a better statistical foundation of cyclical analysis. At the CBS it was Derksen who managed this project that contributed much to improve the calculation methodology of income data. Nowadays the demands of the builders and users of macro economic models still play a major role in the set-up and development of national accounting.

*Keynes and the national accounts.*
Undoubtedly the most important support for further elaboration of the national bookkeeping was the publication of Keynes' "General Theory" in 1936. It marks the beginning of macro economic analysis. This Keynesian analysis directly connects economic theory with national accounting: both use the same set of identities. The consequence of the theory of Keynes was that a shift occurred in the main concept of income used in policy analysis: net national income in factor costs was more and more replaced by gross national income in market prices. The reason was to provide a better insight into the link between the different expenditure categories and income. The Keynesian revolution also prompted the governments to an active countercyclical policy. This created a need for a system of national accounts where the government sector was added to the sector accounts. All in all, thanks to the Keynesians revolution it was widely recognised how important national accounting for preparation and conduct of economic policy is. Keynes himself actively stimulated the advancement of national accounting schemes, particularly in the United Kingdom. At his initiative the most important experts of the national accounting in the United Kingdom, Stone and Meade, made estimates of national income and expenditures in 1941. These data were used to assess the receipts and expenditures of the government into a scheme of balances for the whole economy. And again it was a war which contributed to a prompt implementation of this work. According to Stone the major aim of this exercise was to map the problem of financing the war expenditures. These data were indeed used in the discussions on the government budget during war time

*International comparability*
This marks also the beginning of the era in which national accounting was conducted on the basis of international guidelines in order to promote international comparability. For that reason, the League or Nations (the pre-war predecessor of the United Nations) had already asked for such guidelines in 1939. However, the activities were postponed because of the war. At last, in 1947, the first guidelines were published by the United Nations in a report which consisted mainly of an appendix, drafted by Stone. This appendix can be regarded as the first fully fledged and detailed description of a system of national accounts. The next step were the guidelines that Stone published in 1951 at the request of the Organisation of European Economic Co-operation (OEEC, the predecessor of the OECD). These guidelines were a simplification as compared to those of the United Nations: in fact the guidelines of the United Nations were much too ambitious for most European countries. After a number of following rounds with new guidelines the United Nations published in 1968 a fully revised and very detailed set of guidelines for the construction of national accounts (SNA). Together with the guidelines of the EC from 1970, which were mainly meant to clarify the

guidelines of the United Nations, these guidelines have, for a long period, been the basis for the set –up of the systems of national accounts in the world. As a matter of fact, in order to guarantee the continuity in national accounting, modification of the guidelines should not take place too frequently. It was only in 1993 that the United Nations issued new guidelines.

## 4. History of statistics and economic analysis in the Netherlands

The previous survey of the history of national accounts illustrates the long road from the early calculations of total income and wealth of a nation to today's extended and sophisticated systems of national accounts. In order to obtain a better view on how indicators from the national accounts are used in economic policy analysis, a look into the history of the interaction between data collection and policy analysis is also useful. Here the history in the Netherlands is taken as an example. A historical overview for other countries, especially the United Kingdom, Norway and the United States, is given by Kenessey (1993).

Today empirical analysis and measurement play an essential role in the debate on policy measures in the Netherlands. This interest in actual measurement only slowly and partially emerged between 1750 and 1850 (see Klep and Stamhuis, 2002; Den Butter, 2004). Yet, it were mainly private initiatives of individual scientists and practitioners, and not so much of the government, which brought about this attitude. The estimates by the forerunners Hora Siccama, Van Rees, Keuchenius and Metelerkamp were already mentioned in the previous section.

*Kluit and Vissering*

An early protagonist of actual measurement in the Netherlands was Adriaan Kluit (1735-1807). He was the first Dutch professor to teach statistics under that name. One of the reasons that Kluit started to deliver lectures in statistics was a prize contest by the "de Hollandsche Maatschappij der Wetenschappen" (Dutch Society of Sciences) at Haarlem, which is a learned society founded in 1752 and still existing, and which, in those days, tried to promote scientific research by posing practical questions. The question to which Kluit reacted was 'What is the overall situation, both in general and especially with respect to the economy in our fatherland, and what are the reasons why our country lacks so far behind, compared to our neighbours?'. So it was in fact a quest for economic data which inspired Kluit to get involved in statistics. Kluit did not distinguish between political economy and statistics, and in his specification the state was the centre of attention. So in his work we are at the beginning of the connection between the working of political economy (in Dutch: "staatkunde" or "staathuishoudkunde") and statistics. In this respect it is noteworthy that in Germany political economy or economic political science was called *Statistica* or *Statistik*. This connection can also be traced back to the Italian word 'Statista' or 'Statesman', which has given the discipline of statistics its name.

Although he was a lawyer by education, Simon Vissering (1818-1888) can be regarded as one of the main advocates of statistical quantification of the state of the economy at the

macro level in the Netherlands. He was one of the leaders of the "Statistical Movement", a group of lawyers who dedicated themselves to the development of statistics. Although Vissering was more quantitatively oriented than his predecessors in political economy, his ideas about which data are needed for the description of the national economy, are still rather naïve as compared to the data which are nowadays used to analyse the economy. In the course of the 19th century quantification came to play a more important role, but it was still Vissering's opinion that qualitative information was needed to make the statistical description of a state complete (see Klep and Stamhuis, 2002).

*Descriptive versus mathematical statistics*

It is interesting to note that in the development of measuring the state of the economy (and society) in the 19th century no much reference seems to be made to the work of early "quantitative" economists such as Petty and King in the UK, or Keuchenius and Metelerkamp in the Netherlands, as discussed in the previous section. Moreover, there was still a large gap between descriptive and mathematical statistics. In the latter discipline the Belgian statistician Lambert Adolphe Jaques Quetelet (1796-1874) was a forerunner. In 1834 Quetelet was one of the founders of the London Statistical Society, nowadays the Royal Statistical Society. Morgan (1990) describes how, in the history of statistics, Quetelet's statistical characterisation of human behaviour proved to be of great importance. He noted that individuals behave in an unpredictable way, but that taken together these apparently disorganised individuals obey the law of errors in deviating from the ideal "average man". Obviously this is one of the basic notions in econometric methodology, used in the evaluation of economic policy measures. So Quetelet can be seen as a first bridge-builder between the mathematically oriented statistical approach and the descriptive and qualitative-quantitative approach. However, Quetelet's ideas did not reach Vissering and his people. It was only after the 1930's that, with Tinbergen as the great inspirer and teacher, a full integration of both lines of thought in statistics took place in the Netherlands. It is remarkable that, whereas these two lines in statistics had been separated for such a long time, from then on the Netherlands obtained a strong position in econometrics and applied economics.

*Statistics as a public good*

Vissering and his people have played a major role in promoting that the government should regard statistical data collection as a public good and therefore should take its responsibility in collection these data. However, in the second half of the 19th century the government was very reluctant to take up this responsibility. Therefore, in 1866 Vissering took a private initiative to compose and publish general statistics for the Netherlands. However, this large project has never been finished (see Stamhuis, 1989, 2002). In 1884, when the Dutch government was still not willing to collect statistical data in the public domain, a Statistical Institute was established by these private people. At last, in 1892, after questions in the Second Chamber of the Parliament by, amongst others, the socialist member of parliament, F.J. Domela Nieuwenhuis, de "Centrale Commissie voor de Statistiek" (Central Committee for Statistics) was installed. Finally, in 1899 the Central Bureau of Statistics (CBS) was founded, which from then on conducts its task to collect independent and undisputed data for public use in the Netherlands. The Central Committee for Statistics still

exists and has a role as supervisory board for the Central Bureau of Statistics. Its responsibilities were even expanded by decision of the Parliament in 2003. In fact, the lobby to have the government collect statistical data at the level of the state was much conducted by the "Society of Statistics", founded in 1849 (see Mooij, 1994). After 1892, now that the lobby of the society for data collection by the government had finally been successful, the main focus of the society became more and more on economics. Therefore, in 1892, its name was changed in Society for Political Economy and Statistics. Yet it was more than half a century later, namely in 1950, that the focus of the society was really reflected in its name which now became Netherlands Economic Association. Finally, in 1987 the Queen honoured the society by granting it the label "Royal". So since 1987 we have the Royal Netherlands Economic Association, which, given its start in 1849, is probably the oldest association of political economists in the world.

*Micro versus macro data*

As mentioned before, a major question in national accounting is on how to aggregate individual data to the macro level. In this respect Van den Bogaard (1999, Ch. 5) gives an interesting description of the long discussions between Tinbergen and the CBS on transforming individual data from budget surveys to national data on consumption which could be used in consumption functions of the Keynesian macro models of those days. In the 1930's consumption was still something related to individual incomes, classes of people and their social role in society. It was indeed only in the early 1950's that data collection and statistical methodology to analyse data at the macro level, were really integrated.

## 5. The Tinbergen legacy and the institutional set-up of policy preparation in the Netherlands

This integration of data collection and statistical methodology is an important aspect of how indicators of the national accounts are used in economic policy analysis. For a more comprehensive answer to that question it is useful to look at the institutional set-up of economic policy preparation of a country. Again the Netherlands is taken as an example. The present institutional set-up of policy preparation in the Netherlands can, in a way, be seen as a spring-off of Tinbergen's theory of economic policy, where scientific insights on how instruments may affect policy goals are separated from political preferences on trade-off between these policy goals (see Tinbergen, 1952, 1956). These ideas were, of course, very much inspired by the political and societal landscape in the Netherlands in the period between the First and the Second World Wars (see also Van Zanden, 2002, for a broad historic perspective). In the years just after the Second World War, when Tinbergen designed his theory of economic policy and was active in the institutional set-up of policy preparation in the Netherlands, the Dutch society was still very much "pillarised". The four main pillars were the liberals, the Catholics, the Protestants and the socialists. Each of them were represented by one or more political parties with implicit preferences on policy goals in their own, so to say, social welfare function. As they all are minority parties, there has been always a need for the formation of a coalition government. The leaders of the political parties or pillars did realise that it is impossible to meet all of their own policy goals in such a coalition government. Although the pillarised society has changed very much since then

and there has been a steady “depillarasation”, still all parties are minority parties, even more so then before, so that the need for a compromise agreement for the coalition government has remained.

*The CPB Netherlands Bureau for Economic Policy Analysis*

The analysis of the Dutch Central Planning Bureau has from its start played an important role in the design of the policy preparation in the Netherlands. Nowadays the bureau calls itself CPB Netherlands Bureau for Economic Policy Analysis, because there is no true “planning” involved in the activities of the bureau. More specifically the analysis is an important input for the negotiations and social dialogue on policy issues in what has become known as the Dutch “polder model”. It has already be noted that Tinbergen, who became the CPB’s first director in 1945, has built the first econometric policy model (Tinbergen, 1936). Therefore, it is understandable that model based policy analysis has, from the origin, constituted an important part of the work of the CPB. The CPB’s ‘model’ early acquired a high status in academic circles and has come to be regarded in the Dutch society as an more or less “objective” piece of economic science (Den Butter and Morgan, 1998).

However, in the first few years of the CPB there was a fierce internal discussion in the CPB about the way the bureau should give shape to its advices (see Van den Bogaard, 1999). On the one side was Van Cleeff, who had the view that the CPB should follow a normative approach, while on the other side Tinbergen supported the idea of disentangling the positive and normative elements of the analyses. The crucial question in this controversy was about the way economic policy advice would be the most successful in the pillarised economy. Van Cleeff tried to develop an all-embracing normative theory which would integrate the ideas of the different pillars. Like in industry that would lead to a formal policy “plan” which could be implemented by the government in a co-ordinated effort of all citizens, On the other hand, Tinbergen wanted to develop a method that would give the most objective description of reality. The differences between the pillars would then be minimised to their different normative proportions. In other words, he wanted to make a clear distinction between the working of the economy (model) and the policy goals (welfare functions), and then “try to agree on the first and compromise on the second issue". Tinbergen won this battle. Since then, economic policy preparation in the Netherlands is organised in three autonomous parts: data, model and norms. As discussed in the previous section, the data and statistics are collected by the Central Bureau of Statistics (CBS) in an independent and (hopefully) undisputed manner, the working of the economy is described by the models of the CPB and the balancing of different points of view is done by the government in dialogue with unions, employer organisations and other associations of organised interest. This method of splitting facts and politics has, up to now, always been a prominent feature in creating consensus in the Dutch society where all belong to a cultural minority or minority party.

In this institutional set-up the CPB has a major role in describing the working of the economy. It takes the data, collected, and in the case of national accounts, constructed by the CBS, as given. The task of the CPB is to provide a quantitative analysis of the state of

the Dutch economy, based on scientific knowledge. In doing so it tries to establish a *consensus view* on economic developments and the effects of policy measures. Of course others (other institutions) also have a say in this analysis of the Dutch economy based on scientific insights. An example is the Dutch central bank, that makes its own model based analysis of developments and policy measures in the Netherlands. Moreover, in some cases a major discussion emerges with academics and other scientists working outside the CPB (e.g. the Ministry of Economics Affairs, private research institutes) on matters of interpretation of economic developments. Examples are discussions on Keynesian demand policies versus neo-classical policies in the second half of the 1970's, on the need for general equilibrium modelling in the early 1990's, and on the effectiveness of a prolonged policy of wage moderation in the early 2000's. However, these disputes did not refer to the measurement of economic data at the macro level, nor to the construction methods of data.

Nowadays, the analyses of the CPB are widely used as input for social economic policy discussions, e.g. in the Social Economic Council (see below). A typical example of the role of the CPB in using their model based analysis for policy purposes is the calculation of the effects of the policy proposals in the election programmes of the political parties on economic growth, employment, income distribution and so on. Seemingly, it is almost a realisation of Tinbergen's dream to separate the knowledge on the working of the economy, which is contained in the models used by the CPB, and the normative preferences on trade-offs between policy goals, which will differ for each political party. In fact, the CPB has two major tasks. The first is that of national auditor: this implies economic forecasting and assessment of the effects of policy measures for the government and for other groups involved in the policy making process. The second task consists of the CPB conducting, in a more general sense, applied economic research (see Don, 1996). Nowadays the latter task gains importance: extensive scenario analyses and cost benefit analyses are conducted with respect to various aspects of the Dutch economy. There is also a shift towards micro-economic research and evaluation studies. Typical for the institutional set-up of Dutch policy-making are the numerous formal and informal contacts between the staff of the CPB and the economists at ministries, researchers in academia and the staff of the social partners. On the one hand, they provide relevant information to the CPB, but, on the other hand, they will, if needed, be critical on the work of the CPB.

An other major institution in the set-up of policy preparation in the Netherlands is the Social Economic Council (SER) that plays (together with the Foundation of Labour) the central role in negotiations between the various stakeholders to come to a *compromise agreement* on matters of economic and social policy (see for a more elaborate survey: Den Butter and Mosch, 2003, Den Butter, 2006). This is the arena where interaction between scientific knowledge and the policy dispute takes place. The SER is the main policy advisory board for the government regarding social economic issues. Its constellation is tripartite. Labour unions, employer associations and independent "members of the crown" each possesses one third of the seats. The "members of the crown" consist of professors in economics or law, politicians, the president of the Dutch Central Bank and the director of the CPB.

It is through these independent members that the policy discussions within the SER benefit from the insights of scientific research. The analyses of the CPB and also of the Dutch Central Bank carry a large weight in these discussions. Policy advices by the SER are prepared in committees, wherein representatives of the three categories discuss and amend texts drafted by the SER's Secretariat. Representatives of various ministries attend these committee meetings, but formally they are observers. They will not take part in discussions unless they are asked to provide relevant information. So, unlike in other countries, where the third party in tripartite council discussions is the government, in the Netherlands scientists, as independent third party in the discussion, see to it that the social partners do not come to agreements which are harmful to society as a whole. This would be the case when the costs of the policy measures agreed upon, are shifted away from the social partners to the society as a whole.

Obviously it is important for the impact of the SER recommendations that they are supported unanimously. It is quite exceptional that the government would disregard a SER unanimous policy recommendation. The independent members (which, by the way, represent the various pillars in the Dutch society, so that their political colour mimics the political landscape in the country) can be helpful in reaching a unanimous recommendation in informal discussions. The SER chairman, who is also an independent member and understandably has a crucial position in this institutionalised social dialogue, plays a major role.

## 6. National accounts and policy preparation in other industrialised countries

The role of the CBS in the institutional set-up of economic policy preparation in the Netherlands is much linked to Tinbergen's strict separation of the task of independent data collection form the tasks of consensus and compromise formation on economic policy analysis and political decision making. In this respect the institutional set-up in other countries differs from that in the Netherlands, albeit that independence of data collection and compilation carries a large weight in all industrialised and democratic economies.

*Statistics and policy analysis in the UK*[2]

The 19th and early 20th century history of data collection at the macro level in the UK is somewhat comparable to that in the Netherlands. The major government body to collect data at a national level was the statistical department of the Board of Trade. After two journalists had been head of that department, in the early 1870's there were great concerns about the quality of the data. The idea was to establish a central statistical department to service the requirements of all Departments of State. Recommendations were continually made over the years to establish a small central statistical department but they were rejected because of difficulties arising from the laws, customs and circumstances under which the different statistics were collected. In addition to the objections raised by the Board of Trade, Mr Gladstone, then the first Chancellor of the Exchequer, feared that such a central

[2] This section is partly based on information from www.bized.ac.uk

Department might extend its functions beyond the limits required by economy and expediency, and so the recommendations to form a Central Statistical Office were rejected.

Calls for improvements in statistical services continued throughout the 1920s and the 1930s. The outbreak of the Second World War saw proponents for change brought together in the team supporting the War Cabinet. Finally the Central Statistical Office (CSO) was set up on 27 January 1941 by Sir Winston Churchill with the clear aim of ensuring coherence of statistical information and to service the war effort. It quickly established itself as a permanent feature of government. It is interesting to note that again it was during wartime that a major step in the provision of statistical data at the macro level was taken. After 1945 there was an expansion in the work of official statisticians. This resulted mainly from the aim to manage the economy through controlling government income and expenditure by the use of an integrated system of national accounts. The passing of the Statistics of Trade Act in 1947 made it possible to collect more information from industry on a compulsory basis.

The late 1960s saw the performance of the statistical system again come under scrutiny. Following a report of the Estimates Committee of the House of Commons a reorganisation was effected. This reorganisation had four central elements:

- Establishment of the *Business Statistics Office* (BSO) to collect statistics from businesses irrespective of the department requiring information.
- Establishment of the *Office of Population Censuses and Surveys* to collect information from individuals and households through programmes of censuses, surveys and registers.
- An enhanced role for the CSO in managing government statistics.
- Development of the *Government Statistical Service* (GSS), including a cadre of professional statisticians across government.

A new, expanded CSO was established in July 1989. This brought together responsibility for collecting business statistics (previously with the BSO), responsibility for compilation of trade and financial statistics (previously with the Department of Trade and Industry) and responsibility for the retail prices index and family expenditure survey (previously with the Employment Department) with the old responsibilities of the CSO. In early 1990 the quality of economic statistics continued to be of concern to the Treasury and to the CSO. John Major, then the Chancellor of the Exchequer, indicated to Parliament his continuing concern about the statistical base. This was quickly followed by an announcement in May 1990 of a package of measures (known as the Chancellor's Initiative), backed up by substantial additional resources, to improve quality. Finally the CSO was renamed *Office for National Statistics* (ONS) on 1 April 1996 when it merged with the Office of Population, Censuses and Surveys (OPCS).

Economic policy preparation in the UK is very much the responsibility of the Chancellor of the Exchequer, which is the head of *Her Majesty's Treasury*. This institution combines the tasks of the Ministry of Finance, the Ministry of Economic Affairs and a bureau for economic policy analysis (such as the CPB in the Netherlands), and therefore holds a very

powerful position in economic policy preparation in the UK. Civil servants of Her Majesty's Treasury make economic forecasts and policy analyses using their own model of the UK economy. The Cabinet uses these services for the calculation of the economic effects of their policy plans. So the separation between the more or less "objective" discussions on the working of the economy, and on political preferences and trade-offs, is less strict in the UK than in the Netherlands. On the other hand, much model based policy analysis in the UK is done by universities and institutes linked to universities. The Macroeconomic Modelling Bureau (MMB) of the University of Warwick compares and publishes the outcomes of the various UK models (and interprets the differences) so that there is some countervailing power to the policy analysis of the government. The *Bank of England* also conducts model based policy analysis but the citation reproduced by Backhouse (this volume, p.???) sheds some doubts on its influence.

*Statistics and economic policy analysis in Norway*[3]

In Norway, national accounts was, earlier than in most other countries, defined as the framework for the overall economic policy. It was Ragnar Frisch, with Tinbergen the first Nobel price winner in economics, who was responsible for this special type of integration of national accounting and economic policy analysis in Norway, which differed from the Anglo-American approach. Frisch had already in the late 1920's worked on a system of accounting concepts for describing the economic circulation. In 1933 Frisch had recommended the construction of 'national accounts', introducing this term for the first time in Norwegian. Frisch reworked his national accounting ideas several times in the following years, adopting the *eco-circ system* as the name for his accounting framework (and elaborate *eco-circ graphs* as a way of presenting it).

Frisch's national accounting ideas and his active role in the economic policy discussion in the 1930s led in 1936 to a project with colleagues at the University of Oslo, where he started to develop national accounts for Norway. Funds were provided by the Rockefeller Foundation and by private Norwegian sources. In 1940 Frisch had elaborated the eco-circ system from a theoretical level to a quite sophisticated system of national accounts.

The compilation of national accounts tables according to Frischian ideas was continued by some of his former students within the Central Bureau of Statistics (renamed Statistics Norway in 1991). In the first years after WWII, national accounting was at a preliminary stage and international standards were still years away. That is why the early national accounting in Norway in the Frischian tradition had distinct national features, which made it differ from the standard national accounting framework. In the Frischian conception of national accounts above all it were the 'real phenomena' that mattered. The accounts should distinguish clearly between the real sphere and the financial sphere and show the interplay between them. The entries in the accounts should represent flows (or stocks) of real and financial objects. This 'realist' conception of national accounting, supported by Frisch's detailed structure of concepts, was later modified by adopting elements from Richard Stone' s work, and further enhanced by embracing the input-output approach of Wassily Leontief

[3] This section is based on Bjerkholt (1998).

as an integral part. For years the Norwegian approach was one of very few accounting systems producing annual input-output tables. The result was a detailed set of accounts comprising thousands of entries, rather than just a few tables of aggregate figures. It gave the impression that an empirical representation of the entire economic circulation had been achieved and it looked like a wholly new foundation for scientifically-based economic policy analysis.

The use of macroeconomic models for economic policy in Norway has been closely related to the reliance upon 'national budgeting' in the management of economic policy. The idea was that of a budget, not for the government's fiscal accounts, but in real terms for the entire national economy, spelt out in the spirit and concepts of the Frischian national accounts. The national budget served as a conceptual framework as well as a quantitative instrument for economic planning. The national budgeting process was organised by the Ministry of Finance as a network of ministries, other government agencies, semi-official bodies, and co-ordinating committees. The national budgeting in the early post-war period took place in a highly-regulated and rationed economy, and called for the kind of detail that the new national accounts could provide. The value of the national budget was seen in its role as an integrating tool, linking the sub-budgets of ministries, subordinate government agencies and semi-official bodies in the process of working out the economic prospects and economic policies for the coming year.

This programmatic national budget as something different from a forecast of national accounting aggregates raised problems of interpretation and realism. The national budget would not constitute a plan in a meaningful sense unless it was based upon a realistic assessment of the functioning of the economy. The various sub-budgets had to be combined in a such way that all relationships in the economy would be taken into account. However, with national accounts still in their infancy, large-scale models unavailable and computers in a modern sense non-existent, this was a daunting task. In fact it was resolved by the 'administrative method' which at best was an imperfect iterative administrative procedure.

As yet, together with the Netherlands, Norway is the example of a country where interaction between data collection at the macro level and model based economic analysis had an early start. Even more so than in the Netherlands, the Norwegian experiment was, in those early days, directed at detailed economic planning, where the economy was run like an enterprise. In that sense the planning exercise in Norway was much in line with the proposals of Van Cleeff for 'central planning' in the Netherlands. A remarkable difference with the Netherlands (and reflecting differences in opinion between Tinbergen and Frisch) is that in Norway model based economic policy analysis and forecasting has originally been conducted at the same institute as the data collection, namely Statistics Norway. As mentioned before, in the Netherlands Tinbergen advocated a strict separation between on the one hand data collection and on the other hand economic policy analysis and forecasting.

*Statistics and policy analysis in the US*

Unlike in other countries, the US has no single NSO which collects all statistical data. There are several institutions financed by the government which collect and compose data on the state of the economy. The *Bureau of Labour Statistics* publishes inflation and unemployment figures. The *Census Bureau* collects statistics specifically with respect to production, stock building, and population data. The *Bureau of Economic Analysis* (BEA) composes the national accounts based on data collected using by the Census Bureau. Finally the *Federal Reserve Board* (Fed), apart from monetary data, also collects and composes data on the cyclical situation of the economy. This division of labour between the various institutes brings about co-ordination problems. The different institutions, in many cases, use their own methodology, which makes the data difficult to compare, and makes policy analysis based on the data somewhat troublesome. It also leads to much discussion on the quality of the data between the various producers, so that data are less undisputed as, for instance, in the Netherlands.

A powerful institution in the US where economic policy analysis of statistical data at the macro level takes place is the *Council or Economic Advisers (CEA)*. The council consists of a chairperson and two members, appointed by the President of the US. The members are assisted by a relatively small staff. Most of them are university professors on leave from their university, and statistical assistants and graduate students. For this reason the CEA has been strongly related to the academic world. Each year the CEA makes forecasts of macroeconomic developments. An important publication is The Economic Report of the President, which contains the political vision of the CEA. Obviously the composition of this advisory body changes with the political colour of the President. As a consequence, both the contents of the recommendations and the advice process itself depend much on the composition of the government. Although the major obligation of the CEA is to give policy recommendations to the President, it has a broader task in policy preparation. The members of the CEA frequently take part in committee meetings at several levels and can therefore try to persuade, beside the President, other policy makers of their vision. This strong link between the political colour of the President and the composition of the CEA resulted that policy advices have been less consistent than for example at the German Sachverständigenrat (see later). Particularly in the field of the macroeconomic stabilisation policy diverging recommendations have been given by various councils of different political colour. However, on other issues such as the support for free trade and the correction of market failures the CEA has followed a more consistent line.

Another powerful institution in policy making in the US is its independent central bank, the *Fed*. It collects data on the monetary side of the economy and has a large research staff for analysis of all kinds of economic data. Another institute for economic policy analysis is the *Congressional Budget Office*, which is part of the advisory bodies of the Congress. A major task is to make forecasts in a way similar to that of the CPB in the Netherlands.

A difference between the United States and, for instance the Netherlands and Germany, is that there are much less formal and institutionalised channels of contact between scientists and policy makers. On the other hand, the US has a number of private institutions, which conduct fundamental policy oriented research. The *National Bureau of Economic Research*

(NBER) is such private non-profit research organisation of top people from the academic world. Enterprises, several ' foundations ' and the federal government finance this institution with general funds or funds for specific projects. Another institution, the *Brookings Institution*, tries, by organising all kinds of activities, to make a bridge between scientific research and policy. The institute is financed by the turnovers of contract research, donations by charitable institutions, grants and sale of books. Similarly the American Enterprise Institute has much influence as opinion leader on a broad range of topics, albeit in an informal way.

*Statistics and policy analysis in Germany*

The *Statistische Bundesamt* is the central institution for collecting statistical data in Germany. Some 2,780 staff members collect, process, present and analyse statistical information in this Federal Statistical Office. Seven departments and the offices of the President and the Vice-President are located in Wiesbaden's main office, two further departments are situated in the Bonn branch office. The Berlin Information Point directly provides information and advisory services based on official statistical data to Members of the Bundestag, the German federal government, embassies, federal authorities, industry associations, and all those who are interested in official statistics in the Berlin-Brandenburg region.

In accordance with the federal state and administrative structure of the Federal Republic of Germany, federation-wide official statistics (federal statistics) are produced in cooperation between the Federal Statistical Office and the statistical offices of the 16 Länder. This means that the system of federal statistics is largely decentralised. In the context of that division of labour, the Federal Statistical Office has mainly a coordinating function. Its main task is to ensure that federal statistics are produced without overlaps, based on uniform methods, and in a timely manner. The tasks of the Federal Statistical Office include (i) the methodological and technical preparation of the individual statistics, (ii) the further development of the programme of federal statistics, (iii) the coordination of individual statistics, (iv) the compilation and publication of federal results. With just few exceptions, conducting the surveys and processing the data up to the Land results fall within the competence of the statistical offices of the Länder.

So in fact a major part of the statistical data in Germany are collected by these regional statistical institutions. Many cyclical indicators are constructed and published by the *Bundesbank*. Moreover the *Institut für Arbeidsmarkt- und Berufsforschung der Bundesagentur für Arbeit* (IAB) collects, publishes and analyses data on developments at the labour market.

An important link between science and policy advice in Germany is the *Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung* (SVR). This council consists of five members, in most cases university professors. They are the so-called ' five wise'. The members of the council are appointed for five years on proposal of the federal government by the Bundespresident. In practice three members have no links with political parties and interest groups. For the remaining places the employees and

employers organisations can present a candidate, but also the current members of the SVR have a say in these appointments. The Sachverständigenrat publishes each year before November 15th a report on economic developments. Important topics in the analysis are the stability of the price level, developments on the labour market, including the unemployment problem, steady economic growth and an assessment of the position of the balance of payment. Moreover the council must take the income distribution in consideration. The council is asked to propose several policy measures for reaching the policy goals, but no choice should be make. The advice of the council is not bound to be unanimous; members may include a minority opinion in the report. The Sachverständigenrat regularly commissions research to other scientists. In contrast to the CEA in the US, the Sachverständigenrat is politically independent. Moreover, the way new members are appointed ensures that their economic views will not differ radically from those of their predecessors.

Both the Ministry of Finance and the Ministry of Economic Affairs also have their own scientific advisory councils (wissenschaftliche Beiräte), composed of university professors. The current members of these councils propose the new members, so that here there is also some continuity in the line of advice. The task of members of these councils is to give opinions on policy suggestions and to suggest proposals themselves.

An important role in economic policy analysis in Germany is played by the *six independent research institutes*. These have each their own specialisations, although all report on the (inter)national economic development. Although none of these institutes has a specific political background, or is linked to a political party, they do represent different schools of economic thought. For instance, the *Deutsches Institut für Wirtschaftsforschung* (DIW) in Berlin has a more Keynesian orientation, whereas the the *Institut für Weltwirtschaft* (IfW) of the university of Kiel frequently pleads for letting the market forces work and for less government regulation. Twice a year these institutes meet in order to draft a report on the stance of the business cycle for the current year (in April) and for the coming year (in October). It is possible to add a minority opinion to the report. Especially the DIW has often used this possibility. Moreover each of the research institutes publishes its own monthly report. So there is no equivalent to the CPB in Germany. The common (consensus) forecast of the research institutes is not the outcome based on one macroeconomic model, but the result of consultation between the institutes. An important aspect is also that policy makers and politicians in Germany are not very familiar with, and enthusiastic about model based policy analysis.

In Germany the social partners also have their own research institutes. The *Institut der Deutschen Wirtschaft* (IW) in Cologne, financed by the employers organisations, is even one of the largest scientific research institutes in Germany. The counterpart of the trade unions, the *Wirtschafts und Sozialwissenschaftliche Institut* of the DGB (WSI), is somewhat smaller. These institutes publish their own bulletins with analyses of the economic situation and prospects in advance of the autumn report of the six independent institutes, in order to influence the discussion.

*Statistics and policy analysis in France*

Like in the UK, the most powerful institution in economic policy analysis and policy preparation in France is the Ministry of Finance. The power of the Minister for Finance over its colleagues stems from delegation by the President of the Republic. Because of this, a situation can arise where the Prime Minister has no influence on economic policy, because the President imposes another opinion by means of the Minister for Finance.

National accounts' data and other data on the state of the French economy are collected by the *Institut National de la Statistique et des Études Économiques (INSEE)*. It is a "General Directorate" of the French Ministry of Finance and it is subjected to government-accounting rules: it is mainly funded from the central-government's general budget. The INSEE has a rather long history. In 1833 Adolphe Thiers (then Minister of the Interior) founded the Bureau de la Statistique. It became the Statistique Générale de la France (SGF) in 1840. In 1946 the National Institute of Statistics and Economic Studies for Metropolitan France and Overseas Possessions (Institut National de la Statistique et des Études Économiques pour la Métropole et la France d'Outre-Mer) was established. It was later renamed as the INSEE.

Around 1960, the formulation of "Le Plan" in France led to the application of statistics to economic planning and economic-regulation policies. Immediately after the war, a task force had engaged in preliminary national-accounting work. The program was originally carried out by the Finance Ministry's Economic and Financial Studies Office (Service des Études Économiques et Financières: SEEF), and then transferred to the INSEE. National accounting and medium-term forecasting gained momentum in the 1960's The contacts with potential "customers" of statistics were implemented in the National Council for Statistics (which later became the National Council for Statistical Information: CNIS), established in 1972: statistical programs were now discussed with organisations representing the social partners (employers and trade unions). From 1974-1987 one of the most prominent French economists, Edmond Malinvaud, has been director general of the INSEE. This period saw a move toward greater independence for the Institute - a trend begun under the previous directors-general. Many large-scale computing resources were set up, the leading classifications were revised and intermediate accounts, satellite accounts (see later), and major macroeconomic models (DMS, METRIC) were introduced. So, like the situation in Norway, the French NSO does not only collect data but has the combined role of a bureau of statistics and of an institute of applied economic research. Besides data collection and its analysis the INSEE is actively involved in economic research and education. In addition to applied research, focused on policy making, the INSEE also conducts high quality fundamental research.

Another institute in France that resorts under the Ministry of Finance is the *Direction de Prévision* (DP). Although both the INSEE and the DP are involved in economic forecasting, each institute has its own specific responsibilities. The DP focuses primarily on short-term forecasting for economic policy making concerning public finance, foreign relations and the financial sector. The INSEE specialises on the one hand in extremely short term forecasting and on the other hand on long term forecasting. In order to built in some independence between data collection and policy analysis, forecasting and analysis of

policy proposals, which are relevant for actual policy making, are prepared by the DP, and not by the INSEE.

An important feature of the French system is the close interrelations between the Ministry of Finance, the INSEE and the DP. Staff members are often employed by one of those institutions through short term contracts, which result in frequent mutual rotations and increased interaction possibilities.

## 7. National Accounts today

In an early stage one of the main protagonists of national accounting, Richard Stone, realised that the data constructed by the system of national accounts, are to be used in economic analysis in various different contexts. So there always is a tension between the way national accounts data are constructed, and defined, and the theoretical concepts that they are to represent. In other words, Stone was one of the first to pay attention to the issue of what criteria should be used to assess the quality of measurement (see Comim, 2001). The main criteria that the construction of national accounting data should comply with, namely (i) logical consistency, (ii) flexibility, (iii) invariance and (iv) standardised forms, were already formulated by Stone at the beginning of the 1940's.

The conception of *logical consistency* viewed the measurement of national income not merely as a quantification of isolated single magnitudes, but as a quantification of an integrated accounting system in which magnitudes from different sources had to agree. This logical consistency as a balance between measures from different sources was achieved through the principle of double entry applied to a system of four balancing accounts: domestic product account, income and expenditure account, capital transactions account and the balance of payments account. The balancing identities close this system of accounts where each item appears once on the credit side of the balance and once at the debit side. The problem of consistency is the analogue of that described in section 2 where there has to be a balance between the expenditure approach, the production approach and the income distribution approach.

The '*flexibility*' in the formulation of national accounts is, from the perspective of the tension between the construction and economic interpretation of national accounts' data, the most important measurement criterion. The remainder of this section discusses various recent developments in national accounting that comply with this criterion. In 1944 Meade and Stone noted that "there are many admissible ways of defining national income, and there is nothing absolutely right or wrong about any of these definitions" (cited by Comim, 2001). In a broader sense Stone suggested that measurement and economic theory should be tailored to each other's needs. On the one hand the social accounting system should preserve conceptual distinctions that are needed for economic analysis. On the other hand economic analysis should restate its needs in a terminology that could be measured. In modern terminology, one could reformulate this criterion of flexibility as a plea for an open standard for the system of national accounts, where the core of the system is fixed, but

which enables changes in the semantics of the various aggregates. In this vein Stone advocated a system of multiple classifications.

In this respect there is also a tension between the criterion of flexibility and the criteria of *invariance* and *standardisation*. The latter criteria concerned the formal aspects of national accounts and consisted of homogenising definitions, classifications and procedures in order to narrow the variability of measurement. The apparent contrary criterion of flexibility concerned the human context of national accounts and would advocate extending the scope of measurement by introduction of new dimensions of measurement of national accounts.

*Timeliness and accuracy of NA data*

Today, most NSOs publish quarterly national account data and some data are even available at a monthly basis. An important aim of the quarterly estimates is providing consistent and timely information on the recent economic developments in the country. However, NA data, and also the quarterly estimates, suffer from long publication delays. In most cases it will take more than two years when final data can be published. Data published previously are all preliminary and provisional data, bound to revisions. Therefore the analysis of the recent development takes place by means of data which may change considerably. In spite of these uncertainties with respect to the quality of the data, most NSOs provide a quarterly "flash estimate" in order to cope with the need for very recent information. In the case of the CBS this is an estimate of the development of gross domestic product, released by means of a press bulletin eight weeks after the end of the respective quarter. Magnus *et al*. (2000) designed a methodology using available information on indicator ratio's, which can be helpful to enhance the accuracy of recent national accounts estimates. Yet, there always is a trade-off between timelines and accuracy in these estimates (see also Porter, 2007, this volume). It can pose a problem when much weight is attached to these recent data, for instance by financial markets. Market developments and strategic decisions may, with the benefit of hindsight, be based on data which had a very poor information contents. Therefore NSOs should very well monitor the quality of their flash estimates and refrain from publishing them when quality is too poor. They should do that in spite of public pressure to come up with recent information.

*Revisions of NA*

On average each five to seven years a major revision of the national accounts data takes place (see e.g. Blades, 1989). Reasons for these revisions are (i) new basic observations becoming available; (ii) improvement in the construction method and (iii) changes in the definitions and set-up of the system (for instance in response to new international guidelines). These revisions may bring about substantial changes in the final figures of the national accounts. In the Netherlands the last revision was published in 2005 and related to 2001 as the year of revision. This revision had the following consequences for the assessment of the state of the economy and for the economic policy indicators:

1. Gross domestic product was enhanced with 18.4 billion Euro's which implies an increase of 4.3%. This increase was mainly caused by introduction of new insights in the use of statistical information.
2. Gross national income increased with 24.8 billion Euro's

3. The financial deficit of the government (according to the EMU definition) now amounted to 0.2% of gross domestic product instead of 0.1% according to the original calculations.

Obviously these revisions have considerable consequences for the interpretation of historic economic developments, and also, in the above case, in the ranking of nations according to their per capita income. This ranking is often used to illustrate the relative prosperity of nations (see also table 1).

*Modules at national accounts - core module system*

National accounts, in their current form, are a consistent description of economic processes on the basis of one, internationally used framework and terminology. Of course this is not by definition the most suitable system for an analysis of the national economy with its specific institutional characteristics. Although already in its current form the accounting framework satisfies to a large number of user wishes, information relevant for a specific policy analysis may not be contained in the system. Here the trade-off between the criteria of flexibility and invariance (and international comparability) referred to above, plays a part. Moreover the current NA in principle has been set up from the institutional approach (see section 2). The international guidelines have chosen a specific definition of income, which excludes, for instance, domestic production but also the negative consequences of the use of the environment in production. More in general, NA do not provide information on other aspects which are, beside financial income and wealth, of importance for the prosperity of a country. (see the next section)

In order to meet the need of multi-purpose information a more flexible system of NA has been designed. It consists of a (institutional oriented) core and various types of modules (see Bloem et.al., 1991; Bos, 2006). The core focuses on transactions which are in reality expressed in money terms. These transactions are booked (exclusively) for the actors who are actually involved in the transactions. This core module system offers a number of clear advantages above the current system of presentation of NA. In this alternative set-up the users avail of a number of parallel definitions and classifications for various types of analyses. An example is a definition of national income which excludes imputed rents on owner occupied dwellings, which may be relevant representing the transactions motive in a demand for money equation. As a matter of fact this imputed rent does not represent an actual transaction for which money is needed.

Definitions and classifications used in the core can rather easily be understood by general users of NA, because they are in conformity with the international standards, adapted to the sprecific situation of the country. The modules make it possible to zoom in on a specific topic of research by using alternative definitions and classifications. In this way the modular approach enables to illustrate in detail various relationships between economic, social and technical phenomena, whereas on the other hand the connection with the core system remains preserved. An example is the relationship between economic developments as registered in the national accounts, and total spending of time by a population. An advantage is also that the description in a module must not inevitably be registered in monetary terms (for example

it is preferable to register unpaid labour in terms of time spent). A difference between the modular system and the traditional system is that the core of the modular system may contain much more side information.

The general idea of a building-block system with a core and satellite modules has been incorporated in the most recent official guidelines of the United Nations and of the European Union. For example, the United Nations guidelines contain a separate chapter on satellite accounts, (to be) supplemented by various handbooks, e.g. on environmental accounting (see Bos, 2006). In the Netherlands, the CBS has been an early promoter of satellite accounts, and a number of modules have been developed and made operational, namely (i) the relationship between the environment and the national economy; this extensive environmental module can also be used to illustrate trade-offs between production and environmental degradation; (ii) human capital and research and development; (iii) social protection; (iv) non-market production; (v) the illegal economy; (vi) income and expenditure by socio-economic group: the so called Social Accounting Matrix (SAM) (see Keuning and De Ruijter, 1988, Keuning, 1991).

*Flexibility and transaction costs*

Today's emphasis on the on the flexibility of the system of national accounts reflects the wishes of national accountants to make the system more user friendly and to adapt to changes in the needs for data in economic analysis. In this perspective there is an analogy to the argument by Mayer ( this volume, p.??). He describes the relationship between readers and authors of scientific articles as a principal agent relationship. The author (as agent) has more information on his/her research, but the description of the research should, in a concise way, provide the essentials of the information so that the reader (as principal) can make a good judgement on the value and importance of the research. Likewise the national accountant (as agent) should in the construction of the data provide as much as possible the information which the user of the data (the principal) needs. Tinbergen's organisational set-up of economic policy preparation can, along these lines, be seen as a multilayered principal agent relationship. The CSO is the agent for the modelling and forecasting agency, and on their turn, these model builders, model users and forecasters are the agents of the policy makers who use these analyses in their debates and compromise agreements on proper policy measures. A major advantage of such strict organisation and separation of responsibilities is that it minimizes transaction costs in the policy discussions. In the context of the principal agent model these transaction costs can be associated with bonding costs, monitoring costs and residual loss. The more the national accountants are prepared and able to fulfil the wishes of the users, and communicate the information contents of the data in an adequate manner, the less effort the users of the data have to conduct their research in a proper manner. In the multilayered principal agent model discussed above, all experts involved in policy preparation – statisticians, model builders and model users, policy makers - should familiarise themselves with the concepts used in the analysis. Such common economic framework, where all "speak the same language", greatly contributes to the efficiency in the policy discussions. Of course, as Den Butter and Morgan (1998) note, there is much interaction between policy makers, model builders and model users. So there is no one way stream of information from agent to principal (or vice

versa). In the context of the principal agent model this interaction could be seen as a way of goal alignment, so that the residual loss (agent has different goals than principal, or principal has no clear goals given the external conditions) as part of transaction costs is minimized.

## 8. The use of NA Indicators in welfare and policy analysis

The major aggregate economic indicators from the national accounts are national income and national product in their various definitions. These data are often used as indicators for economic welfare and prosperity. There is ample theoretical literature on the representation of economic welfare by national accounting (e.g Weitzman, 1976, Asheim, 1994). Asheim and Buchholz (2004) developed a framework for national income accounting using a revealed welfare approach that covers both the standard utilitarian and the maximin criteria for welfare as special cases. They show that the basic welfare properties of national income accounting do not only cover the discounted utilitarian welfare functions, but extend to a more general framework of welfare functions. In particular, under a wider range of circumstances, it holds that real NNP growth indicates welfare improvement. Also from the empirical perspective developments in real national income (per capita) show a substantial correlation with indicators which are specifically used as indicators of non material welfare, such as child mortality, literacy, educational attainment and life expectancy. The Human Development Index (HDI), published annually by the UN, ranks nations according to their citizens' quality of life rather than strictly by a nation's traditional economic figures. The ranking of countries according to HDI in table 1 shows that the top of the list consists only of industrialised countries with high national per capita incomes. The table uses the 2005 index which is based on 2003 figures. Yet, the table also shows that within this group of industrialised countries, the ranking according to HDI and according to GDP per capita may differ considerably. For instance, Australia and Sweden obtain much better scores for HDI than for GDP per capita. The opposite holds for the United States, and, surprisingly, for Ireland and Denmark.

However, from a more operational perspective there is much criticism and discontent with national accounting data as indicators for welfare and specific economic developments. For instance, Van Ark (1999) mentions a number of problems when national account data are used for the analysis of long term economic growth. In that case long and internationally comparable time series are needed on (changes) in real GDP and its components. Van Ark's first concern is the *weighting procedure*. Changes in volume terms need necessarily be related to a benchmark year with a given basket of goods and services. The weights of the benchmark year are representative for the volume index or price index used for the calculation of volume data over the whole time period. Ideally one would wish to use the regular shifts in weights in benchmark years every five or ten years, and some coordination amongst various countries would be highly desirable. However, such data are not available and one has to rely at most on a few benchmark years, and sometimes even on only one benchmark year. The second concern by Van Ark is the *estimation of intermediate inputs, capital and labour*, which are important ingredients of an empirical study of economic growth. With the exception of manufacturing, which in many (trading) countries comprises

only a relative small part of total production, there is very little comprehensive evidence on intermediate inputs in the production process before the era of input-output tables. Historical sources on capital stock and capital services are only available for a very limited number of countries and the consistency of historical labour statistics with national accounts is weak in many cases. The third concern of Van Ark is the *treatment of services*. The measurement of real output in services remained somewhat neglected as much of the work of historical accounts focused primarily on the commodity sectors of the economy. Historical accounts often assume no productivity changes in services and rely largely on changes in the wage bill of services. It appears that on the whole real output growth in services is likely to be understated in most accounts, because the no productivity growth assumption seems to be unrealistic. It may also imply that productivity increases in services are attributed to industry and commodity sectors.

**Table 1. Ranking of countries according to UN Human Development Index, 2005**

*Source: Human Development Report 2005, United Nations*

| Country ranked according to HDI | Rank of country according to GDP per capita, pp US$ |
|---|---|
| 1. Norway | 3 |
| 2. Iceland | 6 |
| 3. Australia | 10 |
| 4. Luxemburg | 1 |
| 5. Canada | 7 |
| 6. Sweden | 20 |
| 7. Switzerland | 8 |
| 8. Ireland | 2 |
| 9. Belgium | 12 |
| 10. United States | 4 |
| 11. Japan | 13 |
| 12. Netherlands | 11 |
| 13. Finland | 16 |
| 14. Denmark | 5 |
| 15. United Kingdom | 18 |
| 16. France | 15 |
| 17. Austria | 9 |
| 18. Italy | 19 |
| 19. New Zealand | 22 |
| 20. Germany | 14 |

*Prices and volumes*

More in general one of the most troublesome parts of national accounting from the perspective of the interpretation of the data is the separation of the observed (changes in)

nominal values in prices and volumes (for reviews see Diewert, 2004 and Reinsdorf, 2007, this volume). Index number theory gives statistical agencies some guidance on what is the "right" theoretical index for determining prices of commodities and services and for aggregation of these prices. The problem, however, is that there have been many alternative index number theories and that statistical agencies have been unable to agree on a single theory to guide them in the preparation of their consumer price indices or their indices of real output.

One of major operational problems is to adjust prices for the quality changes in the attributes of goods and services. For instance, a price increase of a new version of a car may come together with some improvements (higher engine power, more luggage space, new safety provisions) as compared to the older version of the same car. In that case a correction has to be made for these improvements which may imply that the corrected price change is much lower, or even negative, as compared to the actual price change. These implicit changes in the quality of goods and services in the basket of consumer goods used for determining the consumer price index (CPI) has been a major concern for the Boskin commission[4]. When quality changes are not properly taken into consideration, price indices overestimate inflation and hence underestimate volume changes and productivity increases. A method of adjusting prices for quality changes is the so called hedonic method where prices of goods and services are regressed with (quality) changes in the attributes of those goods and services. As yet one should be cautious in the use of hedonic regressions because many issues have not yet been completely resolved. Moreover questions have been raised about the usefulness of hedonic regressions as several alternative hedonic regression methodologies proved to yield different empirical results. Therefore Diewert (2004) notes that there is still some work to be done before a consensus on "best practice" hedonic regression techniques emerges.

A related problem with respect to the construction of price indices is introduction of new products. Here the solution is the reservation price methodology, already suggested by Hicks, which has, however, not been adopted by any statistical agency as yet. Moreover, a final solution for the problem of separating price and volume movements will never be possible as there are, especially in services, categories of products where prices are difficult, or even impossible to be observed. Diewert (2004) gives the following list: (i) *unique products*: that is, in different periods, different products are produced; it prevents routine matching of prices and is a pervasive problem in the measurement of the prices of services; (ii) c*omplex products*: many service products are very complicated; e.g., telephone service plans; (iii) *tied products*: many service products are bundled together and offered as a single unit; e.g., newspapers, cablevision plans, banking services packages; (iv) *joint products*; for this type of product, the value depends partially on the characteristics of the purchaser; e.g., the value of a year of education depends not only on the characteristics of the school and its teachers but also on the social and genetic characteristics of the student population; (v) *marketing and advertising products:* this class of service sector outputs is

[4] It is acknowledged that measuring inflation by the CPI using a basket of consumer commodities is, strictly speaking, not part of national accounting

dedicated to influencing or informing consumers about their tastes; a standard economic paradigm for this type of product has not yet emerged; (vi) *heavily subsidized products*: in the limit, subsidized products can be supplied to consumers free of (explicit) charges: the question than is whether zero is the "right" price for this type of product? (vii) *financial products*: what is the "correct" real price of a household's monetary deposits?; (viii) *products involving risk and uncertainty*: what is the correct pricing concept for gambling and insurance expenditures?; what is the correct price for a movie or a record original when it is initially released?

Diewert also mentions the problem for statistical agencies of how to deal with transfer prices when constructing import and export price indexes. A transfer price is a border price set by a multinational firm that trades products between subsidiaries in different countries. It is unlikely that currently reported transfer prices represent "economic" prices that reflect the resource costs of the exports or imports. As the proportion of international trade that is conducted between subsidiaries of multinational firms is about 50%, it becomes an increasingly difficult challenge for statistical agencies to produce price indexes for exports and imports that are meaningful.

*A more fundamental critique on national income as welfare indicator*

Beside the practical problems of measurement described above, more fundamental critique has been raised against the use of national income data from the national accounts for economic welfare analysis. A recent example is Van den Bergh (2005) who advocates to completely abolish the use of GNP in economic analysis because it provides `misleading information and does harm to welfare`. He repeats a number of arguments from the literature such as the mixing up of costs and benefits in national accounting, government expenditures connected with government failure which reduce welfare instead of increasing it, welfare reductions through market failures which national accounting does not take into account, exclusion of the informal economy and household production from the national accounts (although, as described above, provisions for this are taken in the modules at the national accounts), the neglect of questions of income distribution and loss of information in the aggregation process. A major argument for Van den Bergh are the results of recent empirical studies on subjective welfare, which connect individual welfare with happiness. These studies show that somewhere between 1950 and 1970 the increase in individual welfare (or happiness) has stopped, or even has changed into a negative trend in most industrialised (OECD) countries, whereas there has been a steady and continuous growth of real GNP. There seems to be a `decoupling` between income and individual subjective welfare at the level of about 15 000 to 20 000 dollars income per year (see also Layard, 2006, Helliwell, 2006).

*National accounts and the environment*

In the assessment of the relationship between national accounting and welfare much attention has been paid to environmental issues (see e.g. Mäler, 1991). A major criticism on national income as welfare indicator is that it does not take environmental degradation, or the use of the environment in production, into account. In principle two solutions have been proposed for this problem (see also Den Butter and Verbruggen, 1994). The first solution is

to consider environmental quality as a separate variable (or policy target) in the social welfare function. In that case the argument is on the trade-off between environmental quality and material welfare – as indicated by national income -, given the other variables in the welfare function. The problem in this case is how to determine the composite indicator of environmental quality which reflects this respect of social welfare. The second solution is to correct, in one way or another, GNP for environmental change and arrive at a so called environmentally adjusted GNP: 'green' GNP, eco-GNP or (environmentally) sustainable GNP. Now the problem is how to make this correction which gives an implicit weight to the trade-off between environmental quality and income in the welfare function. Such correction was, by the way, already alluded to by, Clark, (1937, p.9) who indicated a possible ‘deduction for any demonstrable exhaustion of natural resources’.

Both methods obviously represent opponent strategies, which stem from different schools of economic thought. A correction of GNP implies a monetising of environmental degradation (or upgrading) by the statistical agency that publishes these data. It affects the definition of national income and requires an amendment of the theory of national accounting. On the other hand, the calculation of physical indicators leaves the final valuation of the trade-off between economic growth and a clean environment to the users of the data. Then, it may become a political rather than an economic valuation. However, both strategies are not opponent in every respect. For the construction of composite indicators of the state of the environment some valuation cannot be avoided as various aspects of pollution are to be added up, whereas calculation of a green or sustainable GNP implicitly defines an overall indicator for the state of the environment, namely the difference between the traditional GNP and the corrected figure for GNP.

Physical indicators for the state of the environment can be constructed within the framework of national accounts, namely by adding, by way of satellite account, an environmental module to the system (see the description of the modular approach above). In the Netherlands the design for an environmental module to the NA, which yields such satellite account, was made by De Boo *et al.* (1991). Indicators for the state of the environment can be derived from the physical accounts of this environmental module (see e.g. Keuning, 1993, De Haan and Keuning, 1996). A related method is to combine various aspects of environmental quality by using theme indicators. In their environmental indicators for respectively the UK and the Netherlands, Hope et al. (1992) and Den Butter and Van der Eyden (1998) have aggregated such theme indicators of environmental policy (such as greenhouse emissions, acidification, eutrophication etc.) to one overall index. For the aggregation weights of these indices evidence from public opinion polls on the concern for environmental problems is used. In this way preferences with respect to trade-offs between various aspects of the environment are taken into account in the overall indicator.

The second way to incorporate the environment in national accounting is, as mentioned before, to correct GNP for environmental damage. A strong proponent of this methodology is one of the pioneers in environmental economics, Hueting. In many publications he has proposed a practical methodology for the calculation of an environmental correction, which is based on sustainability norms (e.g. see Hueting, Bos and De Boer, 1992). Hueting’s

proposals for the correction of GNP for environmental loss has been made operational for the Netherlands by a research team at the Institute for Environmental Studies (IvM) of the Vrije Universiteit chaired by Verbruggen (see Gerlagh et al., 2002). They use a computable general equilibrium model calibrated to a benchmark year. The equilibrium obtained with an unrestricted version of the model is compared with the equilibrium obtained when the sustainability standards are included as constraints in the model. GNP in this new equilibrium, which appears to be (much) lower that the original equilibrium because all standards are binding, is labelled "the sustainable national income according to Hueting" for the benchmark year. Clearly this calculation of the sustainable NI cannot be taken as a simple statistic-technical correction in the system of the national accounts. That is why, in Tinbergen's set-up of separated responsibilities in economic policy preparation, this model based calculation should not be conducted by the NSO (CBS in this case) but by outsiders (in this case the IvM).

*The road back from macro to micro?*

The main skill of national accounting is to construct, in a consistent framework, meaningful data at the macro level from individual observations. However, today there is a tendency of data users to ask for more and more detail in the economic indicators: the road back to the micro level. Below three examples are given of this tendency.

Firstly there is a growing need for detailed information on various sectors of the economy. The problem here is how to define the various sectors and how to allot individual observations at the firm level to these various sectoral accounts. Sectoral disaggregation becomes even more difficult now that more and more production processes are split up due to subcontracting and outsourcing. Even at the plant level firms fulfil various different functions in the production chain so that a functional approach would be better suited for the purposes of data analysis than the present institutional approach in sectoral accounting. Think of multinationals like Shell, Unilever and Philips, which are in the statistics part of the industry sector, but which have in their home countries mainly an orchestrating function where goods and services are produced all over the world at lowest prices and sold at highest prices. Reductions of transaction costs (e.g. by innovations in subcontracting and outsourcing, or by creating much value by smart marketing) will, according to the sectoral accounting, result in productivity gains of the industry. The economic interpretation of such productivity increase is often that it is caused by product innovations, which is not true in this case (see WRR, 2003). In fact, macroeconomic research in this field of productivity analysis and growth accounting increasingly use microeconomic data sets with individual firm data which cover the whole economy. Modern computer facilities and empirical methodology facilitates such analysis. NSOs are capable and willing to make these data sets available for professional researchers.

The second example relates to the consumer price index (CPI). The CPI is used for indexation of all kinds of economic quantities such as wages and pension income. Calculation of the CPI is based on an basket of goods and services for the average of all individuals. However, the price inflation calculated by the CPI differs for each individual and group. Frequently specific groups, such as the elderly, are dissatisfied with indexation

according to the average CPI when they believe that inflation has been above average for their group. On that occasion they ask the NSO to calculate a CPI for their specific group – obviously no demand for a group CPI occurs when the inflation of that group is believed to be below average. In principle NSOs are able to calculate a CPI for each individual person – or to be more precise: for each individual basket of goods and services. So they can comply with the demand for CPI's for various (sub)groups of the population. The question is whether such proliferation of CPI's is wise from both a political and a statistical viewpoint. From a political viewpoint it is not wise because the use of these disaggregated CPI's will always be asymmetric and biased to bring more inflation. From a statistical viewpoint, researchers at the Netherlands CBS, Pannekoek and Schut (2003) have shown that it is not wise either. They looked at price increases within and between four different groups of income earners, namely (i) households with wage incomes (workers); (ii) households with income from capital and own occupation (self employed); (iii) households living on social security and assistance; (iv) household with old age pensions (elderly). There appeared to be some persistent (but hardly significant) differences in inflation rates between these groups. However, differences within these groups appeared to be much larger. Therefore the CBS decided, for the time being, not to comply with the demand to publish regularly CPI's for various groups.

The third example is somewhat related to the previous one, albeit that the result here is a presentation of data at the micro level rather than (solely) at the macro level. Traditionally the Netherlands CPB calculates short term prospects for the purchasing power of Dutch households. The outcome of these calculations carry a heavy weight in the policy discussions in the Netherlands. The effect of each policy measure on purchasing power is closely looked at by politicians and the media, and often policy measures are very much fine tuned (and therefore sometimes made too specific and complicated) in order to avoid losses of purchasing power, especially for low income groups. As a matter of fact, in the Netherlands it is the indicator which carries the largest weight in policy discussions on measures which affect the income distribution and in the yearly negotiations on the government budget. The CPB used to present (and still is presenting) the effects on purchasing power for the average of different income groups: minimum wage earner; modal wage earner; two times modal wage earner etc.. However it was perceived that these average outcomes at the macro level did not provide a sufficient picture of the underlying effects at the individual level. For instance, when the government declared that, on the basis of the average outcomes, through a combination of policy measures, the purchasing power of the whole population would increase, the media and politicians of the opposition were always able to find an unfortunate and poor individual, who suffered a substantial decrease in disposable income by the combination of the policy measures. The Social Economic Council even published a lengthy advice on how to present indicators of purchasing power. It made the CPB decide to present the development of purchasing power in scatter diagrams, where each point in the scatter represents a specific small groups of similar households. These scatters for six different categories of households are reproduced in Figure 1. They show for most households of all categories an increase of purchasing power in 2006 as compared to 2005. Policy measures seem to be most favourable to households with a single wage earner. Most households with two wage earners will also see their

purchasing power increase, but here there is a considerable number of households that will not profit from the policy measures (and in this case, start of the cyclical upturn). The same holds true for the other categories of the Figure. So the scatter diagram brings more sophistication to the policy discussions than a simple presentation of averages at the macro level in a table. Although the scatter diagrams may seem complicated and difficult to understand at first sight, nowadays all participants in the social economic policy debate in the Netherlands know perfectly well how to interpret this representation of the indicator. A disadvantage of this indicator is, like in the case of aggregated purchasing power indicators, that it does not reveal the dynamics of moving to another group (e.g. from unemployed to employed). Policy measures often aim to give incentives for such transitions.

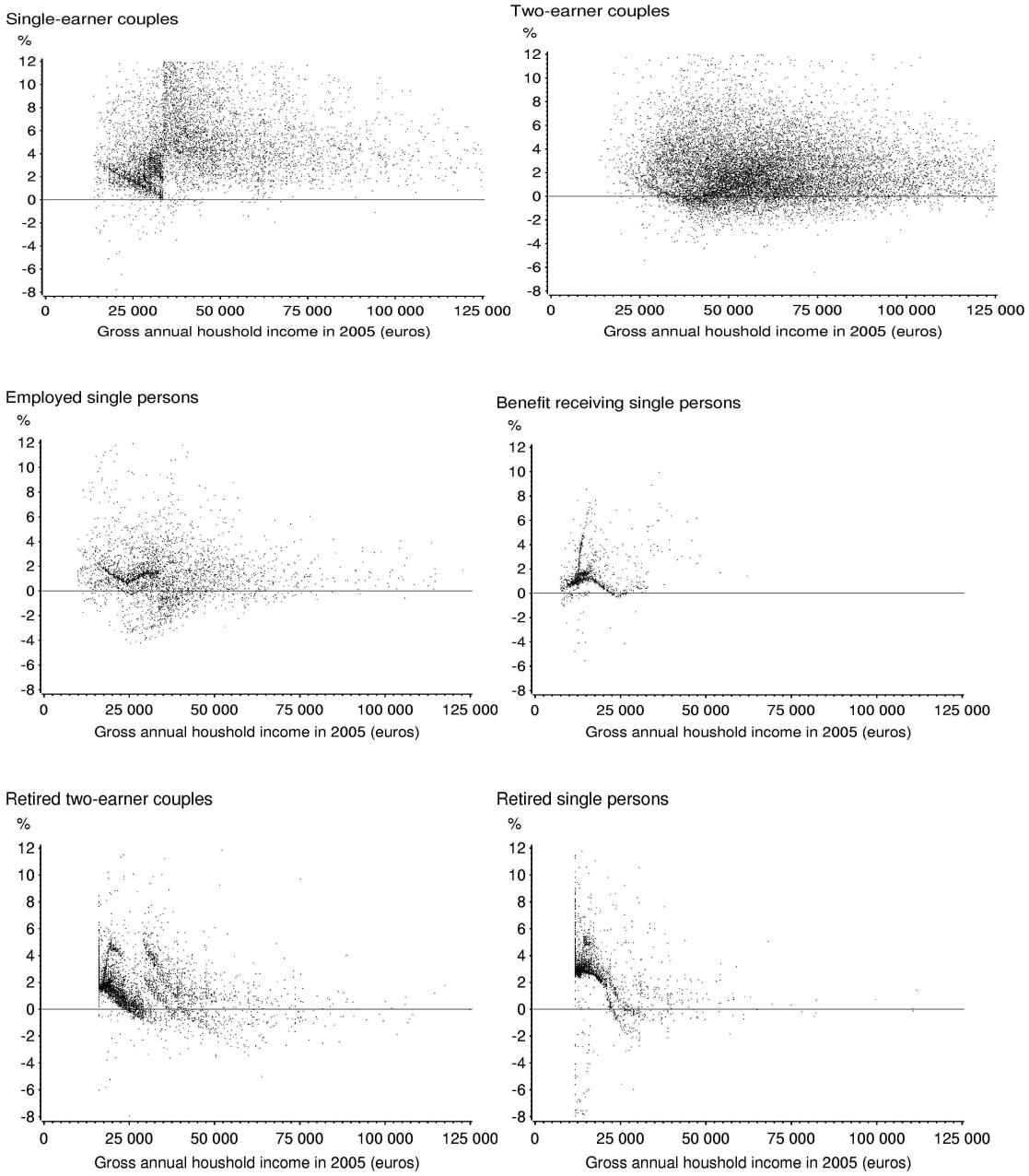
## 9. Conclusions

National accounts (NA) and the indicators derived from the system of national account plays a major role in economic policy preparation and in the political debate on welfare and well being. For a structured discussion on these matters it is essential that technical aspects of data construction are as much as possible separated from the policy interpretation of these composed data which often has a normative and political character. This separation of responsibilities leads to a considerable reduction of transaction costs in discussions on the effects of policy measures as in that case the discussions are based on the same undisputed data and use the same concepts known to all participants in the discussions.

This chapter lays much emphasis on the institutional set-up of (economic) data collection at the macro level, with the Netherlands as an example. National accounts' data, and all other data which describe developments at the level of the state (or parts thereof) have the character of a public good and should be collected by an independent National Statistical Office. The first problem is an aggregation problem: how to come from individual data at the micro level to aggregate data at the macro level so that, as much as possible, normative elements are excluded from the aggregation process. National accountants have solved this problem by being very precise about the definitions of the various concepts of the NA. Consistency is obtained by an accounting framework of double (or even triple) bookkeeping where total income should be equal to total expenditure. International comparability of the data is obtained by following international guidelines.

**Figure 1 Purchasing power by household type, source of income and household income (changes in %), 2006.**

(source CPB: Purchasing power in 2006 according to MEV 2007)



The second problem, however, is that of interpretation of indicators derived from the NA. Here different users of the data may warrant different definitions in order to let the data conform to the specific concept used in the analysis. This chapter extensively discusses the concept of welfare, but similar arguments hold for the discussions on poverty: NSO´s collect data on income distribution, but the transformation of these data into one of the many indices of poverty contains normative elements. So, besides internal consistency and international comparability, flexibility is another criterion for NA. As yet this criterion of flexibility does not imply that national accountants and NSO´s themselves are to publish various concepts according to alternative definitions which have a specific normative interpretation. They should allow others, by kind of open standards, to make such calculations. Satellite accounts are useful in that respect.

On several occasions interpretation of indicators at the macro level is troublesome anyhow. The discussion on purchasing power in the Netherlands is a clear example. In such cases, presentation of micro data in other forms than as aggregate indicators can be a solution. This road back from macro to micro is an apparent trend in economic analysis. Therefore, making relevant sets with individual data available for professional users has become an important task for NSO´s.

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